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**MONTCLAIR
STATE
UNIVERSITY**

Final Report

Summer Program in Environmental Science, Ecology, and Computer Technology

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SUMMARY The Passaic River Institute organized and provided three sessions of a two-week (10-day) summer program for aspiring seventh and eighth grade students from Newark. Photos of the program appear on the next page. A total of 58 students participated, with an average daily attendance of 17; 504 student-days of instruction were delivered. The level of participation was consistent with the program's capacity of 60 students.

A bus from Montclair State University picked up the students each morning at one or more schools in Newark and returned them to the same location in the afternoon. Three program staff, including two certified teachers, administered program, which included a no-cost lunch each day. A detailed day-by-day listing of daily themes, sub-themes, sites visited, science lessons and computer lessons appears below.

The morning of each of the program (except for the final two days) consisted of a guided field trip to a site with notable ecological features or important environmental infrastructure (e.g., water, sewage, trash), with science lessons and/or recreational activities incorporated into the visit. Each student was given a low-cost digital camera to use during the tours. Tours sites included:

- Newark's Water Treatment Plant, West Milford, NJ
- Great Falls Historic Area, Paterson
- Biological and chemical sampling and analysis, Branch Brook Park or Weequahic Park, Newark
- Essex County garbage incinerator and electricity generating facility, Newark
- Sewage treatment plant, Newark
- Estuary and tidal wetlands of the Hackensack Meadowlands
- Floodplain wetlands of the Passaic River, Essex County Environmental Center, Roseland
- Hiking and forest ecology in South Mountain Reservation, Maplewood.

Afternoons were spent in a computer lab at Montclair State. Students learned computer software and applied it to investigations and presentations about the sites they visited and related environmental issues. Software included an Internet browsers and search engines; MS Excel spreadsheet for managing, analyzing, and graphing data; digital photography tools; web page development; and MS PowerPoint. On the final day of each session, the students presented their work to parents and classmates.

Scientists and engineers from academia and industry were also invited to discuss their academic and career path as well as their present work. The discussions took place on the site tours, in the computer labs, and in their labs at Montclair State.

The goals of the program were to:

1. expose Newark students to fascinating and beautiful natural features within their watershed and to the environmental infrastructure that supports their life;
2. stimulate curiosity and excitement in the students about ecology, environmental science and computer technology;
3. introduce the substance and tools of a career in ecology or environmental science/engineering;
4. place students in a university environment, interacting with college students and professors as role models to encourage students regarding the feasibility of attending college; and
5. encourage students regarding the feasibility of a career in these fields.

The program was evaluated by administering pre- and post- questionnaires regarding attitudes toward the environment and knowledge of the local environment sites which were visited. Comparison of pre and post scores on the attitudinal questionnaire revealed a statistically significant change in the students' environmental worldview. With 98% confidence, we can say the students held more positive attitudes toward the environment after the program than they did before it. The percentage of students answering each of 10 knowledge questions correctly increased (post vs pre) dramatically (i.e., between 76 and 30 percentage points) for 8 of the 10 questions.

A general post-program questionnaire was also administered which asked whether the program increased the participants' knowledge/interests in science, the environment, computer technology, attending college, and pursuing a career in science (which were objectives of the program). Large majorities of the participants reported that the program increased their knowledge/interest in all categories except one, a strong indication that the program met these objectives. In addition, 49% of the participants reported that the program increased their interest in pursuing a career in science. Another questionnaire asked them to rate each tour experience as excellent, good, fair, or poor regarding the tour was educational and enjoyment value. Overall, the participants found the program activities both educational and enjoyable. Summaries appear in the full report below, with full results in the appendix.

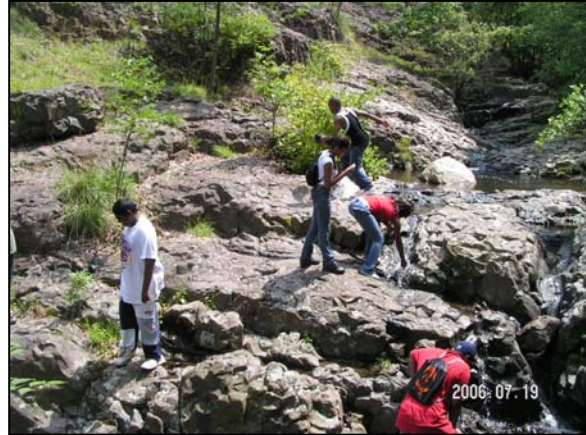
Besides the quantitative results from these questionnaires, the program was evaluated subjectively by the staff. The three program staff who interacted with the participants daily were all pleased with what the program accomplished. It was clear that most participants had not visited the sites before, nor thought much about the issues the sites represented; in this respect, the program was successful in achieving goal #1. During final presentations, many presenters stated that they had learned a lot and enjoyed the program. From observation of the final presentations, it was obvious that many participants had acquired significant knowledge during the program. Most student participants were enthusiastic and engaged, so goal #2 was met. Certainly, through the discussions with scientists/engineers, lab visits and daily use of professionally-used computer software, goal #3 was met.

Summer Program Photos

Sampling invertebrates in Branch Brook Park lake



Hiking across rock stream channel in South Mountain Reservation



Final Presentation with parents attending



Dr. Duke Ophori, MSU Professor, demonstrates a model of groundwater flow



Peering inside the furnace at the Incinerator



Catching fish in the Meadowlands



PROGRAM PLANNING AND PREPARATION

Fund-raising A challenge grant of \$25,000 was awarded by the Victoria Foundation in December 2005, contingent on successfully raising additional funds necessary to run the program. BMW of North America awarded \$5,000 in March 2006. The Port Authority of New York and New Jersey awarded \$5,000 in April 2006. The Landsberger Family Foundation awarded \$5,000 in June 2006. The total amount raised was \$40,000.

Recruiting and Selecting Participants Initially, the plan was to offer the program to Newark high school students. Conversations with Newark teachers revealed, however, that it would be very hard to recruit high school students because they preferred work in the City's summer job program. So, we changed the focus to aspiring 7th and 8th grade students, who are too young for the summer job program.

To recruit students, we contacted the Banneker Science Center, a district-wide science education support center. Mr. Paul Izzo, K-8 Science Coordinator, supplied the names and e-mail addresses of the lead science teachers and principals in all schools with 7th and 8th grades. We sent a letter explaining the program to each of these teachers and principals, asking them to distribute information and applications for the program.

We also contacted Newark Public Schools Guidance Director Ms. Shirley Grundy, who sent the information and application to all guidance counselors.

Students sent applications directly to us. We received 109 applications for 60 available slots (20 students in each of 3 sessions).

To simplify pick-up and drop-off logistics, we decided to concentrate on a few schools that had large numbers of applicants:

- Luis Munoz Marin School, 633 Broadway, North Ward
- Dr. William Horton School 291 North 7th St, North Ward
- Alma Flagg School 150 Third Street, North Ward (near Horton)
- Robert Treat Academy, 443 Clifton Ave., North Ward
- George W. Carver School, 333 Clinton Place, South Ward
- Maple Ave School, 33 Maple Avenue, South Ward (near Carver).

Lists of student applicants were sent to the guidance counselor or principal at each school. They were asked to review the list and screen out students for which the program would not be appropriate. We specifically wanted students who were well behaved and had an interest in science and computer technology.

Dr. Barrett held a meeting at each school to which students and parents were invited. At the meeting, he explained the program and the expectations (i.e., show up on time each day, behave well, and be interested in the tour sites and computer lessons).

Although we originally planned to accept students only from the 6 schools mentioned above

(which would have filled the 60 spots), some of the applicants cancelled, leaving available spots. To fill these spots, we identified applicants from nearby schools. These applicants were not screened or met with. In the end, 13 different schools had at least one student participating.

We scheduled the following schools as pick-up points for each session:

Session 1: Monday, July 10–Friday, July 21
Luis Munoz Marin School, 633 Broadway, North Ward

Session 2: Monday, July 24–Friday, August 4
George W. Carver School, 333 Clinton Place, South Ward

Session 3: Monday, August 7–Friday, August 18
Luis Munoz Marin School, 633 Broadway, North Ward
Dr. William Horton School, 291 North 7th St, North Ward.

Hiring and training staff

Originally, the plan was to staff the program with graduate students from the environmental education and educational technology programs at Montclair State. Two graduate students were hired, but both resigned for personal reasons before the program began.

Two of the replacement staff were personal acquaintances of Dr. Barrett with known experience in environmental education: Louches Powell, Jr., a biology teacher at Newark’s Barringer High School, and Gina Mongiello, “watershed ambassador” for the lower Passaic River. The third staff was recommended by one of the original student staff, Mary Todaro, librarian and computer technology teacher at Bloomfield High School. Mr. Powell and Ms. Todaro are certified teachers. Ms. Mongiello is a certified Emergency Medical Technician.

These three staff all turned out to be excellent—devoted, skilled, enthusiastic! They did a great job running the program.

Planning the Curriculum

The month of June and the beginning of July were used for preparation and organization of daily activities and logistics. All tours were scheduled by early June, while all time remaining went to developing and refining the program themes, daily questions (morning and afternoon), performance objectives, computer lessons, and the pre-test and post-tests. The program themes and sub-themes were derived from the original program objective, and then followed the performance objectives and daily focus questions.

Originally, we had planned all-day field trips during the first week, and all day in the computer lab during the second week. We changed this to a daily routine of tours in the morning followed by computer labs in the afternoon for two reasons:

- Afternoons can get very hot, so field activities could be difficult if not dangerous
- It was better to apply the computer software to analyze the field trip topic on the same day, rather than have a week separation between the two activities.

We had also originally planned on an overnight trip to the NJ School of Conservation, Montclair State’s environmental education field campus in northwest New Jersey. We learned, however, that

to take children on an overnight trip would require us to obtain a “Certificate of Approval” for operating a “youth camp” from the New Jersey Department of Health and Senior Services. Since the approval process is time consuming, it was not possible to guarantee acquisition of the certificate before the program started. We decided not to do the overnight trip.

We decided to do a review at the end of each day that had the students writing short answers to the questions:

- What was the most useful or meaningful thing you learned today?
- What was the most confusing point of the day?
- Of all the things that you learned today, about what would you like to learn more?

IMPLEMENTATION

Daily Schedule

The constructs of each day were to follow a basic outline of:

- Bus pick-up at designated school(s) around 9 a.m.
- Greeting and attendance
- Issuance of assigned digital camera, flash drive, and personal notebook/journal
- Daily theme focus questions given
- Planned tour with supplemental lessons
- Bus to Montclair State University for lunch in cafeteria
- Walk to computer lab for daily computer lesson and picture download
- Daily review
- Return bus trip to school(s) around 4 p.m. (Upon drop off, students would either, according to their parent’s specification, go to the Summer Youth Development Program at the drop off school, be released on their own, or be picked up by a parent.)

Throughout each two-week session, environmental education activities and science lab tours were woven into the afternoon sessions as appropriate and feasible.

A detailed description of each day’s theme, focus questions, and activities is contained in Appendix 1.

Discussions with scientists

One goal of the program was to expose students to the types of careers available in science and engineering and the type of training needed. The students had discussions with scientists and engineers who worked at facilities where we toured, namely the water treatment plant, the waster incinerator, and the sewage treatment plant. Here, the tour leaders discussed the career paths, their training and different aspects of their jobs.

Back at Montclair State, students took time out from the computer lessons for a talk/discussion with Ms. Donna Lorenzo, who directs MSU’s “Upward Bound Program” and the “Health Professions Program” for disadvantaged and minority students. Each session also had a lab tour and talk with Professor Quinn Vega, a molecular biologist who works on DNA sequencing.

Professor Duke Ophori, a hydro-geologist, also demonstrated a model of groundwater flow and discussed his career path and training.

Attendance Report											Average	Number attending at least one day	
	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10			
Session 1	18	18	19	17	18	18	16	14	16	15	16.9	19	
Session 2	16	17	19	18	18	16	14	17	15	16	16.6	21	
Session 3	17	18	17	16	17	16	17	18	16	17	16.9	18	
Total number of students participating												58	
Overall average dailiy attendance												16.8	
Student-days of instruction												504	

EVALUATION

Attitudes toward the environment

On the first and last day of the program, the students were given a questionnaire, “The New Ecological Paradigm” developed by Dunlap, Van Liere, Mertig, & Jones (2000), to measure attitudes toward the environment. The questionnaire is presented in Appendix 2. Comparison of the post-test scores with the pre-test scores revealed a statistically significant change in the students’ environmental worldview. With 98% confidence, we can say the students held more positive attitudes toward the environment after the program than they did before it.

Increases in Environmental Knowledge

Environmental knowledge was assessed via a test with 10 multiple choice questions administered at the start of the first day and on the last day. The percentage of students answering each question correctly increased (post vs pre) dramatically (i.e., between 76 and 30 percentage points) for 8 of the 10 questions (see table below). For 8 of the 10 questions, the changes were statistically significant at a 99% confidence level. The percent correct on the post test for "In what city is the largest waterfall in New Jersey?" and "How is Newark’s garbage disposed of?" are very high, 95% or greater. Percents correct on the other post-test questions are not as high (less than 65%), but, again, much larger than for the pre-tests (with two exceptions: "What problems do contaminated sediments cause?" and "Where is Newark’s treated wastewater discharged?" – clearly concepts which need to be addressed more clearly next year.)

Post vs Pre Test Results regarding Environmental Knowledge

	Question	Pre-test Percent Correct	Post-test Percent Correct	Percentage point increase
1	In what city is the largest waterfall in New Jersey?	17%	93%	76
2	How is Newark's garbage disposed of?	32%	95%	64
3	What is nonpoint source pollution?	17%	63%	46
4	From what source does Newark's drinking water come?	15%	59%	44
5	What is an important benefit wetlands provide?	10%	52%	43
6	What is a definition of a watershed?	21%	60%	38
7	What are combined sewers?	22%	60%	38
8	Newark's wastewater treatment plant is most effective at removing what pollutants?	24%	55%	30
9	What problems do contaminated sediments cause?	17%	21%	5
10	Where is Newark's treated wastewater discharged?	7%	2%	-5

**Evaluation
by
Participants**

On the last day, students were also given a questionnaire that asked them to specify whether they agreed with statements that the program increased their knowledge and/or interest in science, environment, computer technology, and attending college. Large majorities (>65%) of the participants reported that they agreed the program increased their knowledge/interest in all categories except one, a strong indication that the program met these objectives. In the remaining category, 49% reported the program increased their interest in pursuing a career in science. A summary table appears below.

The program increased my ...		Session 1	Session 2	Session 3	Overall
	n:	15	17	17	49
		5=strongly agree 4=agree 3=neutral, 2=disagree 1=strongly disagree			
		Percent answering 4 or 5, sorted by decreasing overall			
knowledge about the natural features within the Passaic River watershed.		93%	88%	94%	92%
knowledge about the environmental infrastructure that serves Newark.		93%	88%	94%	92%
understanding of how computer software is used in science.		80%	82%	88%	84%
interest in computer technology.		80%	76%	88%	82%
interest in attending college.		87%	71%	82%	80%
understanding of what scientists do.		87%	65%	82%	78%
interest in ecology and/or environmental science.		67%	65%	82%	73%
interest in studying science.		73%	59%	65%	65%
interest in pursuing a career in science.		40%	47%	59%	49%

Another questionnaire asked them to rate each tour experience as excellent, good, fair, or poor regarding the tour was educational and enjoyment value. A summary appears below. Overall, the participants found the program activities both educational and enjoyable. The average rating for all activities' educational value was between good and excellent by all sessions. Overall, all but one activity had an average enjoyment rating above "good," but 5 session-average ratings were below "good." Interestingly, the computer labs were rated highest overall on both education and enjoyment.

Participants we also offered space for any comments on the program, but only two comments were received.

Staff Evaluation Besides the quantitative results from these questionnaires, the program was evaluated subjectively via the staff. The three program staff who inter

REFERENCES

Dunlap, R.E., Van Liere, K.D., Mertig, A.G., & Jones, R.E. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), 425-442.

APPENDIX 1
DETAILED DAILY THEMES, SUBTHEMES, FOCUS QUESTIONS AND ACTIVITIES

Overall Program Theme:

The Passaic River, its tributaries, and its watershed are an important resource for the citizens of Newark and northern New Jersey.

Day 1 Theme: Providing clean, plentiful drinking water to NJ residents requires much diligence and planning.

Subthemes:

1. Protecting watersheds is important in protecting water quality and quantity.
2. Water treatment plants and other infrastructure are needed to achieve, ensure, and deliver safe drinking water.
3. Because New Jersey is also prone to periodic droughts, water storage reservoirs and water conservation are necessary.

Morning Destination: City of Newark's Pequannock Water Treatment Plant, West Milford, NJ

Supplemental Lesson/Activity: from Healthy Water Healthy People "Looks aren't everything" pg 99

Afternoon Destination: Computer lab at Montclair State University

Computer Lab activities: Students will demonstrate their knowledge of Newark's water treatment plant and watershed lands by creating a news account of the visit. Microsoft Word, digital images, flash drives.

The summer program began with a visit to the Pequannock Water Treatment Plant in West Milford, New Jersey, which processes half of Newark's drinking water. A tour of the plant and its surrounding reservoirs/watershed were conducted. Some important introductions were made on issues of water sampling, water contamination, the importance of natural areas on drinking water supply, and infrastructure. The concept of a watershed was introduced in the afternoon by use of the dynamic watershed exercise from New Jersey Waters Curriculum. Key terms introduced (and later reinforced) here were watershed, topography, elevation, and run-off. The computer lab was introduced and students created a "news account" on the water treatment plant.

Day 2 **Theme:** The Passaic River has helped people and people must now help the Passaic River.

Subthemes:

1. The Passaic River was important in industrial development in New Jersey.
2. Industry has negatively affected the Passaic River.
3. There are many ways people can help the Passaic River.

Morning Destination: Great Falls of the Passaic and the Paterson Museum, Paterson, NJ

Supplemental Lessons/Activity: Project WET "Energetic Water," p. 242

Afternoon Destination: Computer lab at Montclair State University

Computer Lab activities: Following a tour of the Great Falls, students will demonstrate their understanding of the role of the falls in NJ history and the development of manufacturing by creating a web page. Use Microsoft Word to create simple web page that has two images (min), 9 facts and links to 2 additional web sites. Microsoft Word, digital images, flash drives.

Tuesday morning consisted of a guided tour of the Great Falls in Paterson, NJ and the Paterson Museum. A video summarizing Paterson's importance in the industrial revolution, early immigration, hydroelectricity, natural disasters like floods and fires, and natural beauty was shown. Students then walked over and viewed the Paterson Falls. The guided museum tour followed, expanding on the morning introduction to Paterson's early industries. In the afternoon students created websites on the Paterson Falls, via Microsoft Word, which were later transferred to a web page. A map of Northern NJ was issued to each student, and they were asked to find and highlight the Passaic River and locate its tributaries. Key terms that were introduced here (and later reinforced) were tributaries, tidal and non-tidal influences, headwaters, upstream, downstream, dams, the Newark Bay, and government boundaries as opposed to watershed boundaries.

Day 3 **Theme:** Urban waters, though often seemingly polluted, can support many different kinds of life.

Subthemes:

1. People can assess the health/pollution status of waters by studying the plant and animal species that live in/near them.
2. People also measure water quality variables that affect aquatic plant and animal life.
3. Common human activities and land use generate pollution.

Morning Destination: Branch Brook Park or Weequaic Park, Newark

Supplemental Lesson/Activity: Test for dissolved oxygen, pH, turbidity, and temp as WQ parameters. Healthy Water Healthy People, "Invertebrates as Indicators," p.174

Afternoon Destination: Computer lab at Montclair State University

Computer Lab activities: After collecting water quality data, students will create a line graph to present information that reflects temperature, pH and DO levels. Use Excel to input data and create graphs. Learn about: Excel, data, flash drive.

Students were bused to a local park, either Branch Brook or Weequaic Park, to conduct water sampling, opinion-oriented surveying, and macroinvertebrate collection. Two groups were formed and both were run simultaneously; then groups were rotated to ensure each student's involvement with each activity. Students collected, sorted, and gathered data on macroinvertebrate and fish samples. Students were also asked to conduct water quality testing for pH, dissolved oxygen, temperature, and turbidity. Point and non-point source pollution definitions were also introduced at the park, helping to make the connection between land use and water quality. The data gathered was brought back to the computer lab and entered into Excel, utilizing its graphing capabilities.

Day 4 **Theme:** Garbage should be reduced and properly managed to minimize pollution.

Subthemes:

1. After a rain storm, much litter washes into the River.
2. Most garbage in America is disposed in landfills, but in Essex County it is burned in the incinerator in Newark.
3. Reducing, reusing, and recycling are three ways we can minimize our garbage.

Morning Destination: Covanta Essex Company Incinerator, Newark.

Supplemental Lesson/Activity: from Project Learning Tree "A Peek at Packaging." p. 322

Afternoon Destination: Computer lab at Montclair State University

Computer Lab activities: After visiting Essex County Recovery Facility and with data provided by staff, students will create pie and bar graphs that reflect garbage distribution and changes over time (Create computer-generated poster, Recycle. promoting recycling-if time allows.)

Use Excel to input data and create graphs. Learn about: Excel, data, flash drive.

Students were bused to Covanta Essex Company (local garbage incinerator) to learn about the process of incineration, as well as the plant's energy production. Some of the many topics and issues introduced (and later reinforced) here were energy production, plant operations, job skills and requirements. Concepts introduced after the tour were garbage practices of the past, present, and future including dumping, landfilling, burning, reducing, recycling, and reusing and how these all have impacts on our rivers/earth. Discussion on the Passaic River's toxic sediment and the many old abandoned industrial buildings that line sections of the Passaic River was highlighted on the bus trip back to Montclair State University. The computer lab lesson was to create another graph, today on the garbage uses across America.

Day 5 **Theme:** Sewage is collected and treated before discharged to waterways, but it can still have negative effects.

Subthemes:

1. Wastewater treatment plants and sewers remove pollutants.
2. Water quality in urban rivers has improved dramatically as sewage treatment was upgraded across the 8nd 1.

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Day 6 **Theme:** The Meadowlands is an example an environment that was polluted and thought worthless, but is now appreciated and thriving.

Subthemes:

1. People dumped garbage into the wetlands of the Meadowlands for decades because they thought the wetlands were worthless.
2. The Meadowlands tidal wetlands provide habitat that is valuable for many fish and birds.
3. Changes in government policy starting around 1970 led to improved sewage treatment and prohibition of unregulated garbage dumping, which has helped the Meadowlands recover.
4. Toxic contaminants remain in the sediments and can enter the food web and harm animals.

Morning Destination: Meadowlands Commission boat/fishing tour

Supplemental Lesson/Activity: *To be decided when we decide on tour

Afternoon Destination: Computer lab at Montclair State University

Computer Lab activities: Use PowerPoint to create a title page, and a five-slide show with text (intro to PowerPoint and practice presentation skills with Smart Board; students will critique each other using a teacher-created rubric). Learn to use: PowerPoint, digital images, Smart Board, and Rubric.

Students visit the Meadowlands and are exposed to the Hackensack River, which is a neighboring river to the Passaic – both empty into the Newark Bay. This area is tidally influenced and is an important wetland area. The concept of tidal wetland is brought into the day’s activities, as the students go for a pontoon boat ride through the wetlands, fish for many diverse species, and talk about the transformation of the Meadowlands—once known as a garbage dump now being highlighted as a tourist attraction and wildlife observatory. Today’s computer lab activity starts with an introduction to PowerPoint. Students are then asked to design a course-appropriate outline of an issue they would like to highlight. The complete outline will later be transferred over to PowerPoint software.

Day 7 **Theme:** Large areas of wetlands remain in western Essex County along the Passaic River.

Subthemes:

1. Wetlands are an important part of a watershed.
2. Some animal and plant species are upland or wetland specific.
3. Wetland soils look, feel, and are different from upland soils.

Morning Destination: Essex County Environmental Center, Roseland.

Supplemental Lesson/Activity: from Wonders of Wetlands "Hydropoly," p. 260 or "Water Under Foot," p. 204

Afternoon Destination: Computer lab at Montclair State University

Computer Lab activities: Introduce g5topics for culminating PowerPoint project on program objectives. Staff to determine requirements (e.g., map of watershed, etc.) Students will begin to plan on paper outline, identify images, charts, pictures, etc., that are to be included in PowerPoint. Learn about: Topics, blank PowerPoint, and frames

Students are bused to the Essex County Environmental Center for an introduction to and education on a non-tidal wetland. Here students are guided by naturalists around the center and are led to a close-by portion of the Passaic River. Here students can start to appreciate the length (over 80 miles) and breadth of the Passaic River. Students are able to view and even catch many wetland species as they learn about the many wetland benefits (flood control, species habitat, pollution filtration, recreation, etc.). The computer lab is spent transferring the presentation outline to actual PowerPoint computer software.

Day 8 **Theme:** There are nearby natural areas (for example, South Mountain Reservation) that provide nature-oriented recreational and learning opportunities.

Subthemes:

1. Nature-oriented recreation can help your mental and physical health.
2. Nature-oriented recreation can help you understand and appreciate the value of nature.
3. Nature-oriented recreation may be a valuable source of new information and exploration.

Morning Destination: South Mountain Reservation.

Supplemental Lesson/Activity: from Project Learning Tree "I'd Like to Visit a Place Where..." p. 188

Afternoon Destination: Computer lab at Montclair State University

Computer Lab activities: Students will use Internet to generate a puzzle of items found in Scavenger Hunt held during South Mountain hike (approx. 30 min). Create puzzle using puzzlemaker.com. Print and create a book of puzzles to be distributed to each student. Continue working on PowerPoint for culminating activity.

Students visit South Mountain Reservation for a morning of hiking and learning. South Mountain Reservation was chosen due to its close proximity to Newark and its accessibility by public transportation. Students had the option of a one- or two-mile hike, depending on their medical conditions and physical abilities. Most students opted for the full two-mile hike, and here they were introduced to topics such as invasive species, wildlife, forest succession, human impact, population control, nature appreciation and others. Those students who stayed behind were also engaged in outdoor discussion about these same subjects. The afternoon session for day 8 was spent in the computer lab continuing PowerPoint presentations.

Day 9 **Morning/Afternoon Destination:** Computer lab at Montclair State University

Computer Lab activities: Continue work on final presentation and science Lab tours at Montclair State.

Lesson/Activity: *Fun activities spaced throughout the day to break up the time in lab.

Computer Lab activities: Complete PowerPoint and practice presentations. Science lab tours.

The ninth day was spent in the computer lab all day with no morning guided tours. The day was used to complete all projects and prepare for upcoming final presentations. In the event that students finished all required work before the day's end, they could search the Environmental Protection Agency website for fun facts or they could make a crossword puzzle utilizing learned vocabulary.

Day 10 **Morning/Afternoon Destination:** Computer lab at Montclair State University

Computer Lab activities: Work on final presentations and present to parents.

The morning was spent for last-minute edits on presentations, as well as preparing the classroom for student's family members. Students were also given a poster-making assignment. They were all given poster paper and markers and asked to make a poster addressing the public. The message was intended to alert and educate the public on an environmental topic of their choice. After completion, posters were hung up around the room and each student voted for three winners: "most creative," "most artistic," and "best message." At this time students were given a compact disc to save all of their work and pictures to, and it was theirs to keep. The afternoon session began as parents and siblings started arriving for presentation viewings. Three to four students shared a computer and took turns presenting their work to their families. A couple of brave students volunteered to present to the entire group. Dr. Barrett addressed and congratulated the group as program certificates were given to each student. Final goodbyes were expressed.

APPENDIX 2

New Ecological Paradigm Questionnaire
developed by Dunlap, Van Liere, Mertig, & Jones (2000).

Indicate your response to each statement using one of these choices:
Strongly Agree, Agree, Not Sure, Disagree, Strongly Disagree

1. We are getting close to having too many people on Earth.
2. Humans have the right to change the natural environment to fit their needs.
3. When humans disturb nature, it often produces terrible results.
4. Human cleverness and skill will make sure that we do NOT ruin the Earth.
5. Humans are greatly mistreating the environment.
6. The Earth has plenty of natural resources if we just learn how to use them.
7. Plants and animals have as much right as humans to live.
8. Nature is strong enough to handle the bad effects of modern developed countries.
9. Even with our special abilities, humans must still obey the laws of nature.
10. The so-called "environmental crisis" facing humans has been blown out of proportion (exaggerated).
11. The Earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature.
13. Nature is very delicate and easily harmed.
14. Humans will someday learn enough about how nature works to be able to control it.
15. If things continue as they are going, we will soon experience a major environmental disaster.